



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/702,156	11/05/2003	David L. Adler	10011.001210 (P0980)	7297
31894	7590	05/04/2005	EXAMINER	
OKAMOTO & BENEDICTO, LLP P.O. BOX 641330 SAN JOSE, CA 95164			QUASH, ANTHONY G	
			ART UNIT	PAPER NUMBER
			2881	

DATE MAILED: 05/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

SM

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/702,156	ADLER, DAVID L.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Anthony Quash	2881	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-27 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. ____   |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>2/17/04</u> .   | 6) <input type="checkbox"/> Other: ____                                     |

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-6,8-15,18-23,27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yin [6,844,550] in view of the "Multiple Electron-Beam Lithography" by Chang et al. With respect to independent claims 1,4,6,9,15, and 20, Yin [6,844,550] teaches a method/apparatus for inspecting portions of a substrate comprising directing N incident beams respectively one N multi-pixel areas on the substrate, detecting electrons emitted from the N areas in a parallel manner; and translation of the substrate in a path that covers approximately 1/N of the portion of the substrate to be inspected. Yin [6,844,550] also teaches there being a plurality of columns, plurality of detectors, plurality of processing sub-systems, and the plurality of incident beams each impinging on a different area, and detecting and processing in parallel (col. 3 lines 1-25, col. 4 lines 65-67) the electrons emitted from the different areas. See Yin [6,844,550] abstract, figs. 1-6,10-11,13,15, col. 1 lines 30-40, col. 2 line 65 – col. 3 line 25, column 4, col. 5 lines 1-40, col. 6 lines 1-10,34-67, col. 7 line 15-20, col. 9 lines 5-15,30-40, col. 10 lines 35-62, and col. 13 lines 1-15. However, Yin [6,844,550] does not explicitly state the beams being multi-pixel beams. The "Multiple Electron-Beam Lithography" by Chang et al, does teach state the beams being multi-pixel beams. See The "Multiple Electron-Beam Lithography" by Chang et al, abstract, first and second paragraphs on

Art Unit: 2881

page 1, paragraph 2-3,5 on page 3 and paragraphs 1-3 on page 4. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to have incident beam from the multiple columns be multi-pixel beams in order to allow the detection of smaller sized defects, and reduce the time need to inspect a substrate for defects.

As per claims 2-3, Yin [6,844,550] teaches the portion of the substrate being inspected comprises all integrated circuit dies on a wafer, and the portion of the substrate to be inspected comprises a fraction of dies on a wafer. See Yin [6,844,550] abstract, fig. 3, and col. 5 lines 1-40.

As per claim 5, Yin [6,844,550] infers a translation mechanism for translating the wafer under the plurality of incident beams such that the plurality of regions are scanned across the wafer. This is made evident when Yin [6,844,550] states, "... a wafer stage with six degrees of freedom of movement .... ... the stage is slowly scanned in the Y-direction. The wafer stage motion is called a serpentine motion (back-and-forth, imaging in both scan directions), ..." See Yin [6,844,550] fig. 3, figs. 15-16, col. 3 lines 1-5, col. 6 lines 50-67. Therefore it is the examiner's view that Yin [6,844,550] does indeed implicitly teach a translation mechanism for translating the wafer under the plurality of incident beams such that the plurality of regions are scanned across the wafer.

As per claim 10, Yin [6,844,550] teaches the plurality of incident beams being generated using a plurality of incident beam columns. See Yin [6,844,550] abstract, figs. 1,3,5-6, col. 2 line 65-col. 3 line 25, col. 4 lines 5-20.

As per claim 11, Yin [6,844,550] teaches translation of substrate in a path such that the plurality of incident beams are scanned across the surface of the substrate. See Yin [6,844,550] fig. 3, figs. 15-16, col. 3 lines 1-5, and col. 6 lines 50-67.

As per claim 12, Yin [6,844,550] teaches the plurality of incident beams comprises N incident beams, and wherein an inspected area during the translation comprises approximately N times an area covered by the translation path. See Yin [6,844,550] fig. 3, col. 6 lines 35-67.

As per claims 13-14, Yin [6,844,550] in view of the "Multiple Electron-Beam Lithography" by Chang et al, teach all aspects of the claims except for explicitly stating that N being at least two and N being no more than fifty. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have N be at least two and N being no more than fifty, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art.

As per claims 18-19, Yin [6,844,550] teaches processing in parallel comprises comparison of the collected data from each area with another set of data, and the comparison comprises alignment, differencing, filtering, and defect location. See Yin [6,844,550] col. 3 lines 1-25, 1-45.

As per claims 21,22, Yin [6,844,550] teaches a first processor system for processing data from the first detector to inspect for defects, and a second processor system for processing data from the second detector to inspect for defects, and a translation system for translating the wafer under the first and second incident beams

Art Unit: 2881

such that the first and second regions being scanned across the wafer. See Yin [6,844,550] col. 2 line 65 – col. 3 line 25, fig. 3, and col. 6 lines 35-67.

As per claim 23, Yin [6,844,550] teaches the first and second incident beams each comprising incident electrons, and wherein the first and second columns each comprising an objective lens and a beam separator device. See Yin [6,844,550] fig. 11, col. 3 lines 1-25, col. 13 lines 1-15.

As per claim 27, Yin [6,844,550] teaches the electrons emitted from the first and second regions comprising secondary electrons. See Yin [6,844,550] fig. 11, col. 3 lines 1-25, col. 13 lines 1-15.

Claims 7-8,16-17,24-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yin [6,844,550] in view of the “Multiple Electron-Beam Lithography” by Chang et al, and further in view of Veneklasen [6,586,733]. As per claims 7,16,24, Yin [6,844,550] in view of the “Multiple Electron-Beam Lithography” by Chang et al, teach all aspects of the claim except for explicitly stating that at least one incident beam comprising incident photons, and wherein the emitted electrons include photo-electrons. Veneklasen [6,586,733] teaches that it was known to substitute an incident beam of photons for and incident beam of electrons to cause the emission of photo-electrons. See Veneklasen [6,586,733] col. 2 lines 1-4, and col. 7 lines 25-28,34-35. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to have at least one incident beam comprise incident photons, wherein the emitted electrons include photo-electrons since it was know to substitute an incident

beam of photons for an incident beam of electrons to cause the emission of electrons as taught in Veneklasen [6,586,733].

As per claim 26, Veneklasen [6,586,733] teaches the incident electrons being at energies below 100 electron volts, and wherein the emitted from the first and second regions comprise reflected electrons. See Veneklasen [6,586,733] fig. 3 and col. 2 lines 12-16.

As per claims 8,17,25, Yin [6,844,550] in view of the "Multiple Electron-Beam Lithography" by Chang et al, and further in view of Veneklasen [6,586,733] teach all aspects of the claim except for explicitly stating that at least one incident beam comprising incident electrons and at least one incident beam comprising incident photons. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have at least one incident beam comprise incident electrons and at least one incident beam comprise incident photons in order to cancel charge buildup on the substrate, since it was known that an incident photon beam causes a net buildup of positive charge on the substrate, and an incident beam of electrons causes a net buildup of negative charge. Therefore it would have been obvious to one employing an electron incident beam to also employ an incident photon beam in order to have the positive charge buildup due to the incident photon beam cancel out the negative charge buildup due to the incident electron beam thereby resulting in a neutral charge being on the substrate.

The applied reference has a common inventor with the instant application.  
Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art

only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). This rejection might also be overcome by showing that the reference is disqualified under 35 U.S.C. 103(c) as prior art in a rejection under 35 U.S.C. 103(a). See MPEP § 706.02(I)(1) and § 706.02(I)(2).

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. U.S. Patents and Published Patent Applications Nos. 6,771,806 to Satya et al, 6,509,750 to Talbot et al, 2002/0161534 to Adler et al, 6,797,955 to Adler et al, 5,892,224 to Nakasuji, 2002/0088940 to Watanabe et al, 4,694,178 to Harte, and 6,855,929 to Kimba et al, are considered pertinent to the applicants' disclosure. Satya [6,771,806] is considered pertinent due to its discussion on a multi-pixel methods and apparatus for analysis of defect information from test structures on semiconductor devices. Talbot [6,509,750] is considered pertinent due to its discussion on an



Art Unit: 2881

apparatus for detecting defects in patterned substrates. Adler [2002/0161534] is considered pertinent due to its discussion on a method and apparatus for inspecting a substrate. Adler [6,797,955] is considered pertinent due to its discussion on a filtered electron beam inspection and review. Nakasuji [5,892,224] is considered pertinent due to its discussion apparatus and method for inspecting wafers and masks using multiple charged-particle beams. Watanabe [2002/0088940] is considered pertinent due to its discussion on an electron beam inspection system and inspection method and method of manufacturing devices using the system. Harte [4,694,178] is considered pertinent due to its discussion on a multiple channel electron beam optical column lithography system and method of operation. Kimba [6,855,929] is considered pertinent due to its discussion on an apparatus for inspection with electron beam, method for operating same, and method for manufacturing semiconductor device using former.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anthony Quash whose telephone number is (571)-272-2480. The examiner can normally be reached on Monday thru Friday 9 a.m. to 5 p.m..

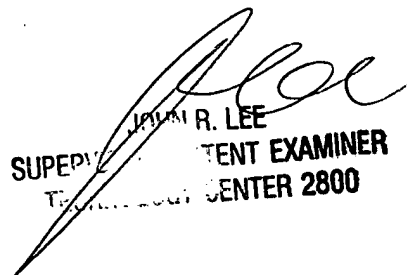
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John R. Lee can be reached on (571)-272-2477. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2881

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A. Quash

*A. Q.*  
4/20/05

  
WILLIAM R. LEE  
SUPERVISOR, PATENT EXAMINER  
TECHNICAL CENTER 2800